



**Europäisches Patentamt  
European Patent Office  
Office européen des brevets**

⑪ Publication number:

0 252 243  
A1

12

## EUROPEAN PATENT APPLICATION

(21) Application number: 87106824.3

⑤1 Int. Cl. 4 A42B 3/00

22 Date of filing: 11.05.87

③ Priority: 30-06-86 IT 2242286 II

④ Date of publication of application:  
13.01.88 Bulletin 88/02

**④ Designated Contracting States:**

71 Applicant: NAVA & C. S.p.A.  
Verderio Superiore  
Como (IT)

72 Inventor: Nava, Pier Luigi  
Via Carnovali 100  
Bergamo (IT)

24 Representative: Klausner, Erich et al  
c/o Ufficio Internazionale Brevetti Ing. C.  
Gregorj S.p.A. Via Dogana 1  
I-20123 Milano (IT)

54 Integral motorcyclists' helmet equipped with a device for air discharge at its top.

57. Shell (10) of the helmet is provided with at least one, but preferably two ventilating air outlet holes (8) placed substantially on the vertical symmetry plane of the shell itself in a retracted position with respect to the summit of the shell, said hole/holes (8) being associated with an ejector device (4) apt to create a depression at the level of said outlet hole/holes to increase the discharge of the air, coming from the internal comfort padding (18), through a radial duct (16) provided in the thickness of the anti shock layer (14), said duct leading to a chamber (12) communicating in turn with said air outlet hole/holes.

The ejector (4) comprises a slider valve (34) apt to open or close fully or partially said air outlet holes.

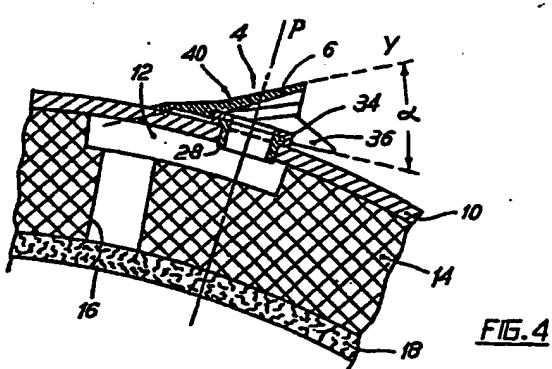


FIG. 4

EP 0 252 243 A1

"INTEGRAL MOTORCYCLISTS' HELMET EQUIPPED WITH A DEVICE FOR AIR DISCHARGE AT ITS TOP "

This invention relates to an integral helmet, equipped with an air ejector device fitted on the helmet's top apt to increase the air circulation in the helmet's interior.

Integral helmets are usually provided with vizors and almost always with a collar which engages the wearer's jaw. In this way the various internal paddings create, especially during the summer time an unbearable overheating of the wearer's head.

To improve the situation, front and/or side openings are provided on the helmets to admit air into its interior, exploiting the running velocity of the vehicle, and also channels within or between the paddings and related air discharges, to cause air circulation into the helmet.

The provisions adopted to date are of limited efficiency as the inlet air quickly loses its dynamic charge, with the result that the volume of air exchanged is quite insufficient.

The object of this invention is to obviate these drawbacks by increasing the air exchange volume at the level of the wearer's head by means of a device apt to increase the extraction of the air itself, synergical with respect to the inlet air flow.

According to this invention, the shell of the helmet is provided with at least one, preferably two holes, to discharge the ventilating air, said hole/holes being located substantially on the vertical plane of symmetry of the helmet's shell, in a retracted position with respect to the top of the helmet itself, said hole/holes being associated with an ejector device apt to create a depression at the level of said discharge hole or holes to favour exhaustion of the air, flowing through one or two ducts offset with respect to said outlet hole/holes, provided in the helmet's shock absorber layer and which lead/s to a chamber communicating with said air outlet holes.

The air outlet hole or holes are covered, in suitable position by an inclined flap the opening of which faces the rear of the helmet, said flap being a fundamental part of the ejector device, while the outlet holes can be closed or partially closed by a sliding closure working substantially in contact with the outer surface of the helmet shell.

The invention will now be described in conjunction with the drawings, which illustrate the application of the present device to a helmet, by way of example only.

Fig. 1 is a side view of the helmet provided with the air extraction device according to the invention.

Fig. 2 is a top view of the air extraction device showing the air outlet holes in transparency

Fig. 3 is an elevation view of the device from direction >III of fig. 2 mounted on the helmet, shown in cross section;

Fig. 4 is a view in cross section of the device taken on line X-X of fig. 2.

Fig. 5 is a diagram showing the flow path of the air exhausted from the helmet.

Fig. 6 is a schematic cross section of the helmet on its vertical symmetry plane to define the position of the device longitudinally with respect to the helmet.

With reference to Fig. 1, helmet 1 is equipped, in the known manner, with a vizor 2 which can be lifted by rotating on hinges 3, positioned symmetrically on the helmet's sides.

The helmet according to the invention is provided, in a convenient position, ( to be described infra ), with an air ejector device 4 formed by a flap 6, provided with lateral walls 7 and covering at least one, but preferably two outlet holes 8 for the ventilating air, said holes being provided on the top part of shell 10, to discharge externally the ventilating air entering the helmet either through a front grate 11 or some other laterally located air intake openings.

In fig. 2, holes 8 are symmetrically arranged with respect to vertical plane X-X at a distance relative to their centers indicatively 30 to 50 mm., the diameter of said holes being equal to approximately 10mm.

As it can be noted in figs 3 and 4, said holes communicate with a chamber 12, obtained by stamping, in the polyethylene shock absorber layer 14; said chamber 12 communicates with the helmet's interior through at least one duct but preferably two ducts 16 offset by about 10mm. with respect to the transversal position of outlet holes 8 so that the holes themselves will not be aligned with said ducts 16.

The duct or ducts 16 outlet at the level of the innermost comfort padding 18 made of open cell type foam material hence permeable to the passage of air, which takes place as shown in fig. 5.

With reference to figs 4 and 3, outlet holes 8 are engaged by a plate 22 the ends 24 of which are restrained on two symmetrical fins 28 provided inside flap 6, and which engages with the holes themselves through semi cylindrical projections 28 fitted on opposite parts with hooks 30.

A slider 34 slides on plate 22; said slide is provided with a handle 36 and holes 38 which can coincide or not with holes 8 to open or close them at the wearer's will.

Ejector 4 made of plastic material, has its opening facing the rear of the helmet and performs the dual function as air ejector and as protection against the infiltration of water into holes 8.

With reference to Fig. 4, the angle  $\alpha$  of inclination of surface 40 of said flap, the extension of which is designated by letter Y, with respect to the tangent plane of the helmet's surface, is comprised between  $25^\circ$  and  $45^\circ$ , preferably  $30^\circ$ .

With reference to Fig. 1 and particularly to Fig. 6, the longitudinal position of device 4, and substantially holes 8, with respect to the helmet is defined as follows :

Taking meeting points K,K' of the straight line determined by the intersection of the vertical plane of symmetry of the helmet with the plane passing through the top edge of vizor 2 and assuming center O of segment K,K' the segment OP passing through said point O and the transversal center line of holes 8 forms an angle  $\beta$  preferably of  $94^\circ$  more or less  $25^\circ$  with the semi straight line OK.

Said variation will be as a function of the type of helmet and its dimensions.

To resume, angle  $\beta$  can vary between  $69^\circ$  and  $119^\circ$ .

Tests conducted in the wind tunnel on a helmet equipped with a device according to the invention proved that even with a single outlet hole 8, ten millimeters in diameter, located in the optimal position above defined, the air extracted from the hole was 24 liters/min. without ejector and 42 liters/min with the ejector.

## Claims

1) Integral helmet, particularly for motorcyclists, provided with vizor and internal padding, consisting of a shock absorber liner adhering to the helmet shell and of a internal comfort padding, in contact with the wearer's head, channels for air circulation placed between said shock absorber liner and comfort padding, as well as apertures for entry of the air, characterized in that the helmet shell (10) is provided with at least one hole, but preferably two outlet holes (8) for the ventilating air of the helmet, located substantially on the vertical symmetry plane of the helmet itself in a retracted position with respect to the summit of the shell, said hole or holes being associated with an ejector device (4) apt to create a depression at the level of said outlet hole or holes to improve extraction of the air, the flow of which, coming from the comfort padding (18) takes place through a duct or ducts (16) provided radially in the body of the shock absorber liner (14) and which leads to a collecting chamber (12) communicating, in turn, with said outlet hole or holes (8).

2) Helmet according to claim 1, characterized in that the radial duct or ducts (16) passing through the shock absorber liner (14) of the paddinglead (s) the one side to a collecting chamber (12) in which open the outlet hole or holes (8) and on the other side at the level of the inner comfort padding (18) made a open cell foam material.

3) Integral helmet according to claims 1 and 2 characterized in that duct or ducts (16) and outlet hole or holes (8) are offset with respect to each other being in communication with each other through collecting chamber (12).

4) Integral helmet according to claims 1 thru 3, characterized in that in the outlet hole or holes (8) are inserted hollow elastic projections (28) secured to a plate (22) and provided, with respect to the centerline of the plate itself, with opposite teeth (30) to engage on shell (10) of the helmet, while said plate engages, in turn, with its ends (24) with fins (26) secured internally to flap (6) of ejector device (4).

5) Integral helmet according to claims 1 thru 4, characterized in that on plate (22) slides a slider (34) equipped with a handle (36) and holes (38) which can be made to coincide or not with outlet holes (8) to open, close or partially open or close the air extracted from the helmet, at the user's will.

6) Integral helmet according to claims 1 thru 5, characterized in that the outer surface (40) of flap (6) forming ejector device (4) is inclined with respect to the plane tangent to the surface of the helmet at the point of application of the flap itself, by an angle  $\alpha$  varying between  $25^\circ$  and  $45^\circ$ , preferably about  $30^\circ$ .

7) Integral helmet according to claims 1 thru 6, characterized in that ejector device (4) is housed across the vertical midline plane of the helmet in a retracted position with respect to the summit of the helmet itself, defined by a tangential point on its shell by a plane parallel to that substantially formed by its lower opening.

8) Integral helmet according to claims 1-7 characterized in that, taking intersection segment (K-K') with the shell of the straight line determined by the intersection of the vertical symmetry of the helmet and of a plane coinciding with the top end of vizor (2), the semi-straight line OP joining the mid point (O) of said segment (K-K') with position (P) of outlet holes (8-8) forms an angle ( $\beta$ ) of  $94^\circ \pm 25^\circ$  with semi straight line (OK).

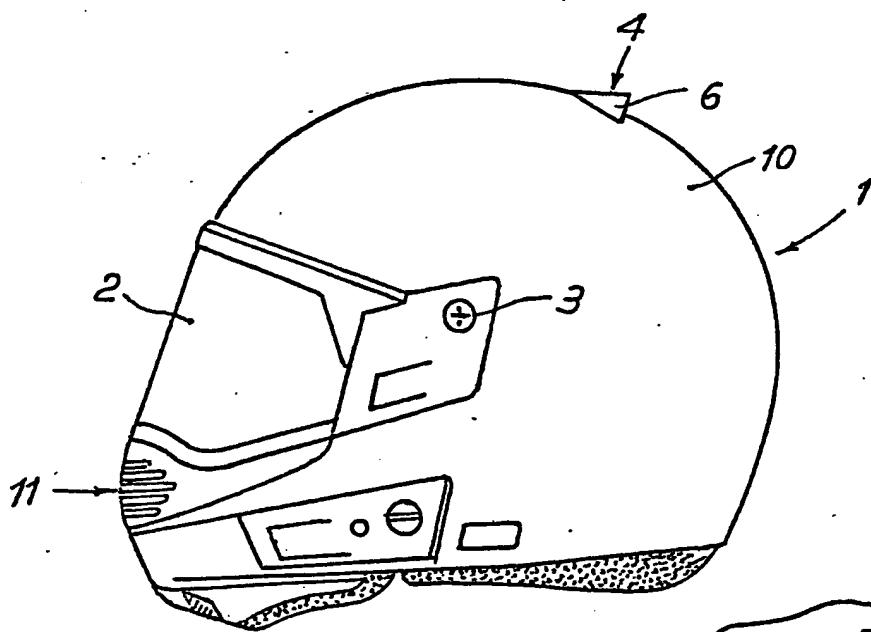


FIG 1

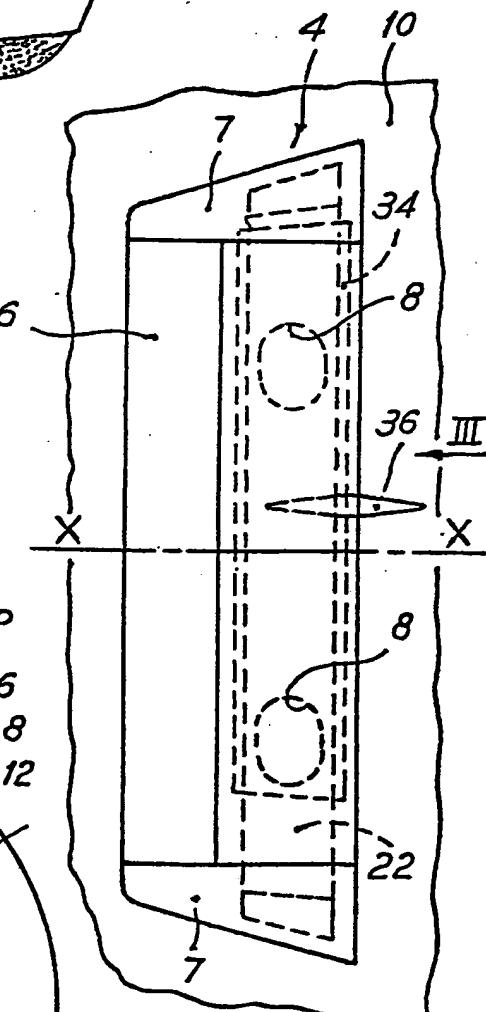
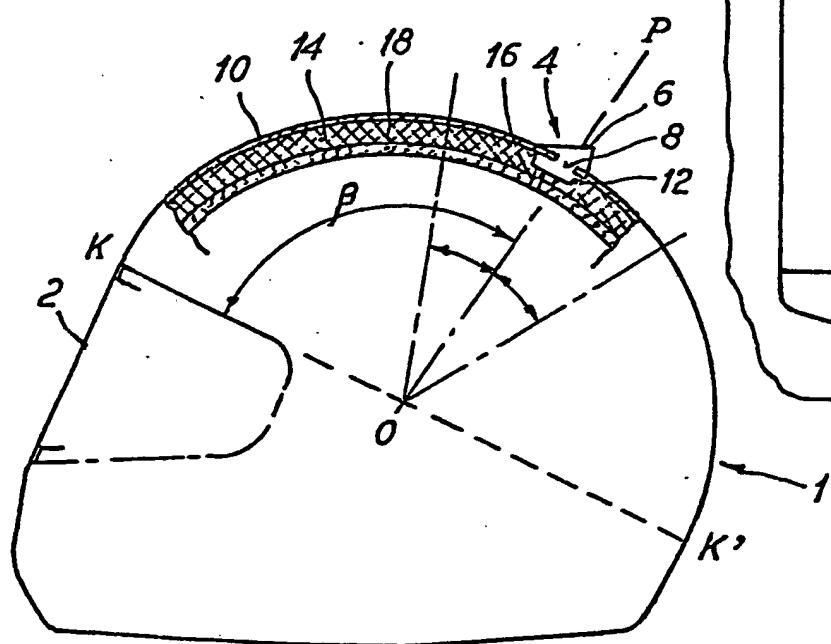


FIG 2

FIG 6



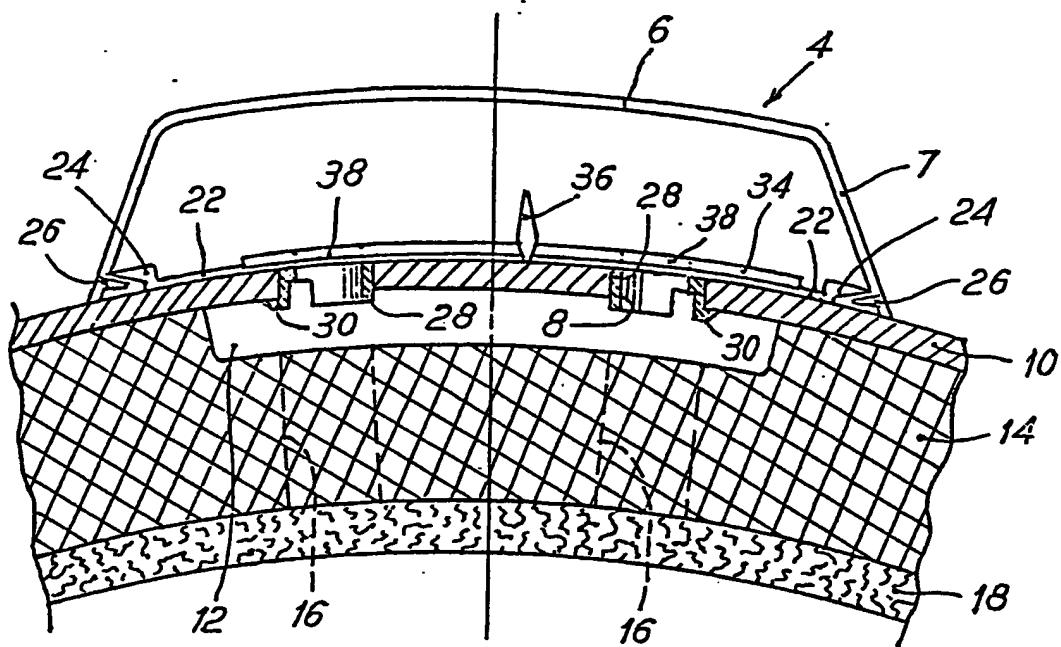


FIG. 3

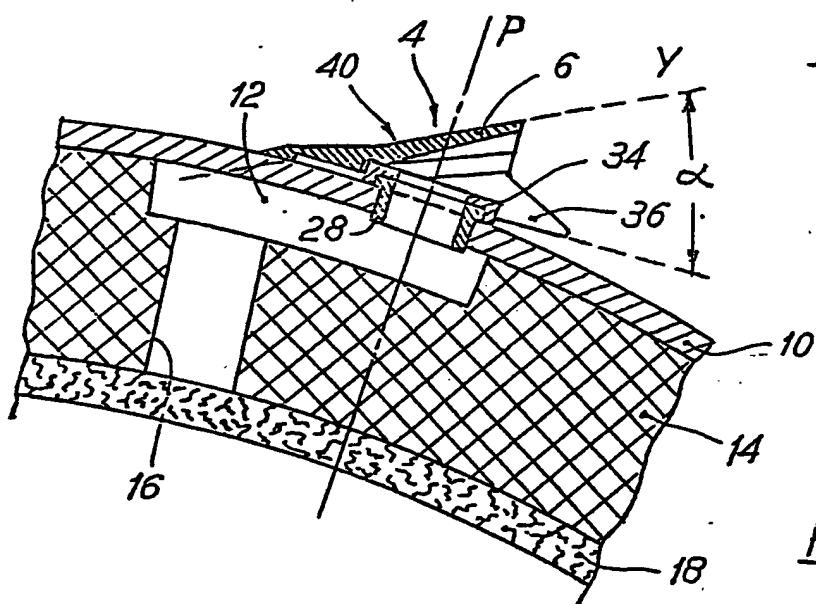


FIG. 4

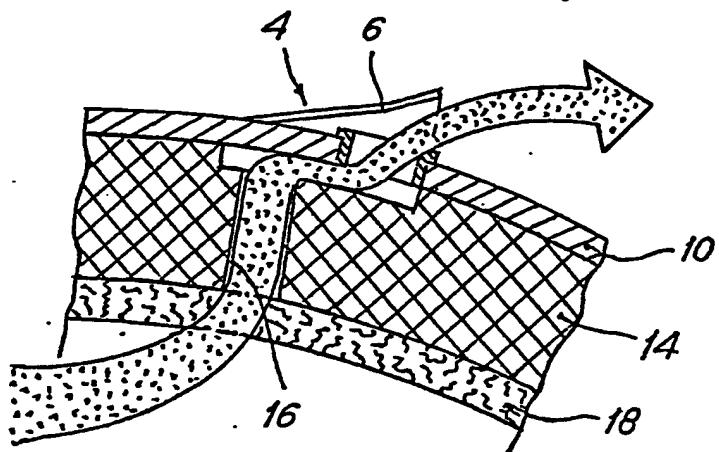


FIG. 5



DOCUMENTS CONSIDERED TO BE RELEVANT					
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.4)		
X	GB-A-2 167 285 (NAVA) * Page 1, lines 74-82, 95-112; page 2, lines 33-76; claims 1,2,6,7,9-12; figures 1,6,7,8 *	1,4-8	A 42 B 3/00		
A	---	2,3			
X	US-A-3 496 854 (FELDMANN et al.) * Column 3, line 29 - column 6, line 48; figures *	1,5			
A	---	2-4,6-8			
A	US-A-4 115 874 (HASEGAWA) * Column 2, lines 29-53; figures *	2	TECHNICAL FIELDS SEARCHED (Int. Cl.4)		
A	GB-A-1 578 351 (DU PONT CANADA) * Page 2, lines 32-41; figure 1 *	3	A 42 B		
P,A	US-A-4 622 700 (SUNDALH) * Column 3, line 60 - column 4, line 4; figures 5,6 *	3			
	-----				
The present search report has been drawn up for all claims					
Place of search	Date of completion of the search	Examiner			
THE HAGUE	29-09-1987	BOURSEAU A.M.			
CATEGORY OF CITED DOCUMENTS					
X : particularly relevant if taken alone	T : theory or principle underlying the invention				
Y : particularly relevant if combined with another document of the same category	E : earlier patent document, but published on, or after the filing date				
A : technological background	D : document cited in the application				
O : non-written disclosure	L : document cited for other reasons				
P : intermediate document	R : member of the same patent family, corresponding document				